

but I do not remember ever hearing this wonderful growth attributed to what I believe to be its real cause, namely, that from the moment that the practical application of electricity became one of the branches of our profession, engineers and physicists have worked closely hand in hand to overcome its difficulties, and to elucidate the questions to which it gives rise. The growth of electrical engineering thus constitutes a great object-lesson, sufficient in itself abundantly to emphasise the fact that the future progress of engineering is indissolubly bound up with the progress of physical research.

THE SOUTH AFRICAN ASSOCIATION.

REVIEWING the brief history of the events which culminated in the first annual meeting of the South African Association for the Advancement of Science, the early proceedings of which were described in our issue for May 21, Sir David Gill, the president, announced some of the facilities which had been offered to induce the British Association to visit South Africa in 1905. The president read a letter he had received from Sir Gordon Sprigg, the Prime Minister of Cape Colony, stating that free railway passes will be granted over the Cape Railway system for all officials of the British Association, and a limited number of invited guests; and that a sum not exceeding 6000*l.* will be guaranteed towards the cost of passages to and from the Cape for the above-mentioned officials and visitors. This amount will be shared by the Governments of the Transvaal, Natal and the Cape. Sir David Gill went on to say that the other Governments had undertaken to share one-half of this responsibility, and to grant similar free use of their railways. There will be no lack of private hospitality, and the council of the British Association will recommend to the general committee of the Association at the Southport meeting next September that the invitation to hold the annual meeting in 1905 in South Africa be accepted.

Reference was also made to the value of a closer alliance between the results of scientific research and everyday practice in commercial pursuits, the classical works of several of the earlier investigators being mentioned as examples of the far-reaching effects of thorough and precise researches into common everyday phenomena. Sir David Gill then proceeded to enlarge upon the practical value of scientific research, and the reasons for its encouragement in the universities and colleges, and mentioned the unselfish work of Profs. Beattie and Morrison in undertaking the magnetic survey of South Africa, during 1897 and subsequent years, entirely at their own cost. He strongly urged that facilities should now be granted to them for completing this most important work, which fills a gap in the observations that are now being carried out in various parts of the world simultaneously with those being made by the various Antarctic expeditions in the South Polar regions.

Two papers read before Section A of the South African Association contained interesting statistics as to different aspects of the mining industries of the new colonies. In a paper on "Nitro-Glycerine Explosives: their Influence on Industrial Development," Mr. William Cullen, of the Modderfontein Dynamite Factory, stated that by means of explosives alone above 12,000,000 tons of ore had been milled in the Transvaal in the year prior to the war, but no estimate could be formed of the many million additional tons removed in developing shaft-sinking and so on. The old dynamite is rapidly becoming a thing of the past, and the more modern blasting gelatin has gradually supplanted everything else. Perhaps the most interesting part of the paper was that where the final triumph of nitro-glycerine in cordite and many similar powders was demonstrated, proving it to be not only the strongest disruptive agent, but also the mildest and easiest managed impellent.

Mr. W. A. Caldecott, in a paper on the "Cyanide Process from its Introduction into the Rand to the Present Day," said the immense importance of the process was shown by the fact that just before the war half the gold from the Rand was obtained by the cyanide process. By way of comparison, the writer stated that the Rand gold output in 1890 was 494,523 ounces milled, and only 286 ounces obtained by cyanide process. In three years the pro-

portion grew to 1,147,960 ounces milled, and 330,510 ounces by cyanidation.

The records of meteorological observations made at the dynamite factory of Modderfontein, which extend over a large number of years, and form probably the most complete Transvaal meteorological record available, were discussed by Mr. William Cullen in Section A. Rainfall, barometric pressure, temperature (maximum, minimum and average), atmospheric moisture, wind velocity and wind direction were some of the meteorological data passed in review. All were illustrated by diagrams. The rainfall for the various years was analysed, and it was pointed out where a departure from the normal had great influence on the agricultural interests of the Transvaal, and on the prevalence of cattle diseases. The average rainfall for the past five years was 25 inches, the highest being 30.6, and the lowest 20.1, and the observations seemed to show that it was on the increase. The barometric readings showed a very slight variation all through the year, the maximum difference of about 14 generally coming in June, but every twenty-four hours the maximum and the minimum records always occurred at the same time.

Prof. S. Schönland, in a paper to Section B on stone implements in the Albany Museum, emphasised the persistence of the Palæolithic age in South Africa as compared with other countries. While, he said, the manufacturers of stone implements in South Africa were not devoid of skill which must excite our admiration, while their arrow-heads of perforated stone, their rolling-pins, their stone rings, indicated that there was not only skill, but an inheritance of trade tricks handed down from generation to generation, which were faithfully adhered to by the masters of the craft, it was astonishing that so far it had been impossible to find any evidence of progress in the manufacture of stone implements in South Africa, such as we knew had taken place in other countries from Palæolithic times to the time when stone implements were given up. Generally speaking, it could be seen that not only had the Stone age persisted in South Africa until comparatively recent times, but that the Palæolithic age had persisted there to the same extent. This was especially shown in the entire absence of polished stone implements.

Dr. J. D. F. Gilchrist dealt in the same section with the development of some South African fishes. It has been commonly alleged that the practice of netting, as carried on in the Zwartkops, the Buffalo, and other tidal rivers of South Africa, has proved destructive to the eggs and spawn of fish. On the commencement of trawling by the Government steamer in False Bay and on the Agulhas Bank, it was urged that the dragging of the net along the bottom of the sea caused the destruction of great quantities of the eggs and young of food fishes. The evidence obtained by an inquiry held by a Parliamentary Commission seems to indicate that many of the common fishes may deposit their eggs on the bottom of the sea. On the other hand, in all the instances where the mature eggs had been procured and successfully fertilised on the Government steamer *Pieter Faure*, they were found to float on the surface of the water, and only after the larvæ had been hatched out some time did they begin to sink to the bottom. It was also brought to the notice of the Commission that it had already been demonstrated in northern waters that there was only one fish of practical economic importance depositing its eggs on the bottom—the herring—and only a small species of herring of little value to the present fishermen occurs in the Cape seas. Recently facilities have been afforded by Government for more careful examination on shore of the eggs and larvæ procured by means of fine nets and from the mature fish. The eggs and larvæ were described of the white stumpnose, red stumpnose, silver fish, sand fish, zeverrim or zee-basje, kabeljaauw, horse fish, red gurnard, klip-fish (two species), sole (two species), and the blaasop, and the ova and larvæ of fish as yet unknown. The general effect of the investigations so far carried out was to confirm that the trawling did not interfere with the eggs of fishes that were of practical commercial value.

At a concluding general meeting of the Association on the last day of the proceedings, the council of the Association for the present year was elected in accordance with nominations received from the chief centres in Cape Colony, Rhodesia, Transvaal, Natal, and Orange River Colony.

At a subsequent meeting of the newly-formed council, Sir Charles Metcalfe was unanimously elected president for the ensuing year and the 1904 meeting to be held at Johannesburg.

The following officers were also elected :—vice-presidents, Mr. Sidney J. Jennings, Dr. Muir, Mr. Gardner F. Williams, and Mr. J. Fletcher (Natal); hon. secretaries, Dr. Gilchrist (Cape Town), and Mr. Theodore Reunert (Johannesburg); hon. treasurer, Mr. W. Westhofen (Cape Town).

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Prof. Darwin and Prof. Larmor have informed the Vice-Chancellor that certain donors desire to contribute a sum of 400*l.* a year, for five years, for the purpose of augmenting the stipends of two university lecturers in mathematics. The object is to enable the lecturers, whose present stipend is 50*l.* a year each, to devote themselves by study and research to the advancement of mathematical science. The donors hope that by additional contributions a sum may be procured which will enable the arrangement to be continued, should it prove successful in the first instance. The general board recommends that the offer should be gratefully accepted, and it proposes that it should be authorised to appoint in October two lecturers in mathematics, who, for the sake of distinction, and to commemorate two of the most eminent of Cambridge mathematicians, shall bear the title of the Stokes lecturer and the Cayley lecturer respectively. The new offices are to be tenable with university and college lectureships.

The general board has been in communication with the council of the Royal Geographical Society respecting the reorganisation of geographical studies within the University. It suggests that a board of geographical studies should be appointed, on which the Society should have representatives; that this board should arrange courses of instruction and administer funds; and that a special examination in geography for the ordinary B.A. degree should be instituted. The council of the Society has agreed to contribute 200*l.* a year for five years, to be met by a corresponding grant from the University, for the expenses of the scheme, and it is hoped that other contributions to the geographical fund may be received. The tenure of the present reader in geography expires at Midsummer, but the general board has postponed making fresh arrangements until the Michaelmas term, when a complete scheme is promised.

The annual reports of the Botanic Garden Syndicate and of the antiquarian committee have been published in the *University Reporter* for June 13. They record a large number of gifts to the collections from many sources.

The professorship of surgery and the new lectureships in electrical and mechanical engineering were duly established by the Senate on June 11. An election to the former will be made during the summer. The latter will be held by Mr. Lamb and Mr. Peace, the present demonstrators of applied mechanics.

At the same congregation the grace which brings to an end the long reign of Euclid, as the sole arbiter of geometry in the pass examinations, was passed without a dissentient voice.

Dissertations and memoirs, constituting records of original research, and qualifying for the B.A. degree, have been approved in the case of Mr. J. C. Simpson, Caius (pathology), and of Messrs. R. K. McClung and J. J. E. Durack, Trinity, Mr. F. Horton, St. John's, and Mr. M. Varley, Emmanuel (physics).

In the mathematical tripos, part i., Messrs. Bateman and Marrack, Trinity, divide the senior wranglership. For the third place four candidates are bracketed, Messrs. Gold and Phillips, St. John's, and Messrs. Barnes and Hills, Trinity. Miss P. H. Hudson, Newnham, is bracketed seventh wrangler. She is the daughter of Prof. Hudson, of King's College, London, and the sister of the senior wrangler of 1898. Her sister was bracketed eighth wrangler in 1900. Six men and one woman obtain first

classes in part ii. of the tripos. In the mechanical sciences tripos, part i., thirty men obtain honours.

THE department of psychology and education of the University of Colorado publishes from time to time booklets dealing with the investigations carried out by its staff. The most recently published number is concerned with certain aspects of educational progress, and includes five original articles dealing with subjects as different as the function of habits and the English Education Act, 1902. Under the title "Miscellanea" are given extracts from educational papers published in different parts of the world, and amongst them are two from NATURE.

AN instructive example of the close connection maintained between the needs of the American commercial community and the technical colleges of the United States is provided by a recent announcement from Chicago. In response to requests from insurance companies, architects, and contractors, the Armour Institute of Technology of Chicago is now offering a four years' course in fire protection engineering, leading to the degree of bachelor of science. This course will be inaugurated in September next under the direction of Prof. Fitzhugh Taylor, formerly engineer of the Underwriters' Laboratories. The requirements for admission are to be identical with those for the mechanical, electrical, civil, and chemical engineering courses. A special feature of the course will be a series of lectures by prominent insurance officials, architects, and contractors upon the practical features of their work. The technical laboratory work of this course will be given at the Underwriters' Laboratories of Chicago. These laboratories, maintained by the stock fire insurance companies, are well fitted for the work, because all new devices, appliances, and materials that enter into the question of fire protection, or have a bearing on fire risk, are taken there to be tested.

THE papers relating to the appointment and resignation of Mr. M. E. Sadler, Director of Special Inquiries and Reports on Education, have been published in a Blue-book (Cd. 1602). It is evident from the documents that Mr. Sadler was anxious to secure that education should have an open-minded and impartial intelligence office as much as the War Office or the Admiralty. With this object in view, and the desire to obtain increased efficiency, Mr. Sadler asked for increased facilities for his work, including "the creation of a new post of scientific assistant in the office of the Director of Special Inquiries and Reports of the Board of Education. The increase in the number of cases, referred to the office of Special Inquiries and Reports, in the consideration of which an expert knowledge of scientific terminology and a general acquaintance with scientific investigation and discovery are indispensable, renders it desirable that one of the officers attached to the staff of the Director of Special Inquiries should be specially charged with the duties of scientific assistant." This was in 1900, but objection was raised to the proposal by the vice-president. An inquiry into the nature of the demands was then asked for by Mr. Sadler, but was not approved. The result of this and other suggestions showed that there was no desire to develop the work of the Special Inquiries Office, but rather to limit it. Matters came to a climax early in this year, when a request for permission to prepare certain reports was made, but was met with objections. Subsequently, the Director framed a memorandum setting forth further needs of the Office of Special Inquiries, and stating that without additional assistance he could not continue to hold himself responsible for the collection and supply of accurate and well-digested information on educational work at home and abroad. The Board of Education failed to agree with the proposals made, and laid down certain new conditions for the conduct of the Special Inquiries Office. The result was that on May 9 Mr. Sadler wrote:—"The arrangements which have been proposed to me for the future conduct of the Special Inquiries Office would, in my judgment, gravely impair the scientific thoroughness and independence of the work of the office, and prove incompatible with future efficiency," and on this account he resigned his post.